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BIOLOGICAL SURVEY OF THE MONOCACY RIVER AND TRIBUTARIES, FROM GETTYSBURG, PENNSYLVANIA, TO THE MARYLAND ROUTE 28 BRIDGE, POTOMAC RIVER BASIN

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I. INTRODUCTION

A biological survey of the Monocacy River and certain tributaries between Gettysburg, Pennsylvania, and the Maryland Route 28 Bridge was conducted in July 1966. The survey was made to determine the biological condition of the stream from its headwaters in Pennsylvania to its mouth downstream from the Maryland Route 28 Bridge near Tuscarora, Maryland.

For purposes of the study, the community of bottom (benthic) organisms was selected as the indicator of the biological condition of the stream. Bottom organisms serve as the preferred food source for the higher aquatic forms and exhibit similar reactions to adverse stream conditions. The combination of limited locomotion and life cycles of one year or more, for most benthic species, provide a long term picture of the water quality of a stream. Fish and algal populations were given some consideration, but only to the extent that obvious conclusions could be drawn based upon casual observations.

In unpolluted streams a wide variety of sensitive clean-water associated bottom organisms is normally found. Typical groups are stoneflies, mayflies, and caddisflies. These sensitive organisms usually are not individually abundant because of natural predation and competition for food and space; however, the total count or number of organisms at a given station may be high because of the number of different varieties present.

Sensitive genera (kinds) tend to be eliminated by adverse environmental conditions, chemical, physical, and biological, resulting from wastes reaching the stream. In waters enriched with organic wastes,

comparatively fewer kinds are normally found, but great numbers of these genera may be present. Organic pollution-tolerant forms such as sludge-worms, rattailed maggots, certain species of bloodworms such as red midges, certain leeches, and some species of air-breathing snails may multiply and become abundant because of a favorable habitat and food supply. These organic pollution-tolerant bottom organisms may also exist in the natural environment but are generally found in small numbers. The abundance of these forms in streams heavily polluted with organics is due to their physiological and morphological abilities to survive environmental conditions more adverse than conditions that may be tolerated by other organisms. When inert silts or organic sludges blanket the stream bottom, the natural home of bottom organisms is destroyed, causing a reduction in the number of kinds of organisms present.

In addition to sensitive and pollution-tolerant forms, some bottom organisms may be termed intermediates, in that they are capable of living in fairly heavily polluted areas as well as in clean-water situations. These organisms occurring in limited numbers therefore cannot serve as effective indicators of water quality.

Streams grossly polluted with toxic wastes such as mine drainage will support little if any biological life, and will reduce the population of both sensitive and pollution-tolerant organisms.

Classification of organisms in this report is considered in three categories (clean-water associated, intermediate, and pollution-tolerant) which provide sufficient biological information to supplement physical and chemical water quality data for a basin-wide analysis. Detailed identification and counts of specific organisms have been tabulated and are attached.

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II. SUMMARY AND CONCLUSIONS

1. A biological survey of the Monocacy River and key tributaries from Gettysburg, Pennsylvania, to the Maryland Route 28 Bridge was conducted in July 1966. Investigations were made at twelve stations on the Monocacy and at fourteen stations on the tributaries.

2. Bottom organisms were selected as the primary indicator of biological water quality.

3. Rock Creek which joins Marsh Creek to form the Monocacy River was found to be polluted downstream from Gettysburg, Pennsylvania, but quickly recovered.

4. The Monocacy River was found to furnish unpolluted water quality from Harney, Maryland, to the Gas House Pike Road upstream from Frederick, Maryland.

5. Organic pollution was found to exist from the Frederick Sewage Treatment Plant outfall to the Route 40 West Bridge.

6. Good water quality was contributed to the Monocacy River by Tom's Creek, Double Pipe Creek, and Hunting Creek. These streams are listed in descending order.

7. Poor quality water was contributed to Tom's Creek by Flat Run.

8. Poor quality water was contributed to the Monocacy River by Glade Creek and Carroll Creek.

9. Good quality water was found in the Monocacy River from the Maryland Route 355 Bridge to the Maryland Route 28 Bridge.

10. Bennett Creek contributed good quality water to the Monocacy River in this reach.

11. The Monocacy River contributed good quality water to the Potomac River at River Mile 153.5.

III. DATA EVALUATION AND INTERPRETATION

Rock Creek and Marsh Creek join at River Mile 52.5 at the Pennsylvania-Maryland State Line to form the Monocacy River. Rock Creek originates in agricultural land north of Gettysburg, Pennsylvania, and flows around Gettysburg, where it picks up a pollutional load but quickly recovers.

Numerous tributaries enter the Monocacy River on its journey to join the Potomac River at River Mile 153.5. Some contribute high quality water while others contribute a pollutional load. The point of greatest degradation was found downstream from Frederick, Maryland. Recovery, however, occurred long before the Monocacy reached the Potomac River.

Sampling stations were located after consideration of the following conditions:

1. Effects of tributaries
2. Areas having a known water quality problem
3. Physical capability for sampling

Bottom organisms are animals that live directly in association with the bottom of a waterway. They may crawl, or burrow in, or attach themselves to the bottom. Macroorganisms are usually defined as those organisms that will be retained by a No. 30 sieve. In essence, the organisms retained by the sieve are those that are visible to the unaided eye.

Each station was sampled once, and the kinds of macro bottom organisms were observed for the purpose of evaluating water quality.

Quantitative bottom samples were also taken, using a Surber Square Foot Sampler or a Petersen Dredge (0.6 sq. ft.) and the number of organisms per square foot was counted or calculated.

Quantitative samples were not taken at stations in noncritical areas or where organisms were sparsely distributed.

Discussions of stations proceed downstream unless otherwise noted.

Station #1 - Rock Creek (joins Marsh Creek to form the Monocacy River) at the U. S. 15 Business Route Bridge upstream from Gettysburg, Pennsylvania

The water was clear and minnows were observed. A total of fourteen genera of bottom organisms was found which included such clean-water forms as mayflies (4) and mussels of the family Unionidae (pearl button clams) referred to herein as Unio mussels. Good water quality was indicated based on the bottom organisms. However, high nitrogen and phosphorus was indicated by the heavy growth of filamentous algae. This station was located in an intensive agricultural area.

Station #2 - This station was located on Rock Creek downstream from Gettysburg, Pennsylvania, at the U. S. 15 Bypass Bridge

This station was located approximately one and one-half to two miles downstream from the Gettysburg Sewage Treatment Plant. The water was clear and some minnows were observed. However, only nine kinds of bottom organisms were found versus fourteen at the upstream station. Six kinds were organic pollution forms and the other three were intermediate genera. Out of 2,651 bottom organisms in the square foot sample 1, 602 were sludgeworms and 762 were bloodworms

(Chironomus sp.), a pollution-tolerant midge larva. In addition, there were 42 air-breathing snails (2 genera) and ten leeches (2 genera). All were organic pollution forms. The balance was made up of 235 scuds, an intermediate form. Organic pollution was indicated at this station.

Station #3 - The Monocacy River at the Harney Bridge near Harney, Maryland

Rock Creek joins Marsh Creek in the vicinity of the Maryland border to form the Monocacy River. The first station sampled on the Monocacy was at the Harney Bridge immediately south of the Pennsylvania State Line. The stream was very clear and minnows and green sunfish were abundant at this station. Improved biological conditions can probably be attributed to Marsh Creek. Sixteen genera of bottom organisms were found which included such clean-water forms as mayflies (2 kinds), a Unio mussel, caddisflies (2 kinds), and riffle beetles. Out of 392 organisms in the square foot sample there were 101 caddisfly larvae, 65 riffle beetles (2 genera), and 18 mayflies (2 genera). While recovery from the upstream conditions was indicated, heavy nitrogen and phosphorus was suggested by the heavy growths of filamentous algae and submerged aquatic weeds.

Station #4 - Monocacy River at the Maryland Route 97 Bridge at Bridgeport, Maryland

Although the water was slightly turbid, a good bottom organism population was present which consisted of thirteen genera. They included such clean-water forms as mayflies, caddisflies, riffle beetles, and Unio mussels (3 genera). Minnows were numerous throughout the area. Good water quality was indicated at this location.

Station #5 - Tom's Creek (tributary to Monocacy River) at the bridge on Creamery Road one mile south of Emmitsburg, Maryland

The water was very clear and minnows were very numerous. Eight genera of bottom organisms were found which included such clean-water organisms as mayflies (2 kinds), caddisflies, and riffle beetles. Mayflies and caddisflies were abundant. Good quality was indicated at this location.

Station #6 - Flat Run (tributary to Tom's Creek which is a tributary to the Monocacy River) was sampled at Route 806 north of Emmitsburg, Maryland

The water was clear and numerous minnows were observed. Only three genera of bottom organisms were found; however, mayflies were very numerous. Good water quality was indicated.

Station #7 - Flat Run at U. S. Route 15 Bridge near Emmitsburg, Maryland

The water had a greenish cast and bottom organisms were very sparse. Only three genera (kinds) of bottom organisms were found which consisted of a midge larva, beetle larvae, and the larva of the smoky alderfly. Two of these are intermediate forms and the third is tolerant of pollution. Degraded biological conditions are indicated at this station.

Station #8 - Tom's Creek at the bridge at the junction of Four Points Road and Keysville Road near Emmitsburg, Maryland

The stream remained clear and minnows were still numerous. There were nine different genera of bottom organisms at this station; however, mayflies and caddisflies could not be found. The only clean-water forms found were two kinds of riffle beetles and a gill-breathing snail. Leeches (2 kinds), a pollution-tolerant form, were

the dominant bottom organisms present. An air-breathing snail, another pollution-tolerant form, was present. The balance was made up of three intermediate forms. A mild organic pollution is suggested at this station. The sewage treatment plant upstream is the suspected source.

Station #9 - Tom's Creek (tributary to the Monocacy River) at Sixes Road Bridge near Keysville, Maryland

The bottom was mostly bedrock and the water was extremely clear. Minnows were numerous throughout the area. A total of twelve different genera of bottom organisms were found. Clean-water representatives included mayflies, caddisflies, riffle beetles, a Unio mussel, and a gill-breathing snail. Mayflies and fingernail clams were abundant. Other forms included smoky alderfly larvae, scuds, flatworms, mosquito larvae, and two genera of air-breathing snails. In addition, darters, a small fish related to yellow perch and walleyes, were sampled. Good quality water was contributed by Tom's Creek to the Monocacy River.

Station #10 - Monocacy River at the Mumma Ford Bridge

The stream was clear and minnows and smallmouth bass were numerous. A total of fourteen different kinds of bottom organisms were found which included such clean-water representatives as mayflies, caddisflies (2 genera) riffle beetles (2 genera), Unio mussels (3 genera), and a gill-breathing snail. Good water quality was indicated.

Station #11 - Big Pipe Creek (joins Little Pipe Creek to form Double Pipe Creek) sampled at Maryland Route 194 Bridge at Bruceville, Maryland

The water was slightly turbid. Eight different genera of bottom organisms were found including such clean-water forms as mayflies (2 genera), caddisflies (3 genera), riffle beetles, and a gill-breathing snail. The other organism was an air-breathing snail. Mayflies, caddisflies, and the gill-breathing snail were abundant. Good water quality was contributed to Double Pipe Creek.

Station #12 - Little Pipe Creek (joins Big Pipe Creek to form Double Pipe Creek) was sampled at Maryland 194 Bridge near Keymar, Maryland

The water was somewhat turbid, but minnows and black bullheads were observed. A total of twelve genera of bottom organisms were found including such clean-water forms as mayflies (2 genera), caddisflies (2 genera), riffle beetles, and a gill-breathing snail. Good water quality was contributed to Double Pipe Creek.

Station #13 - Monocacy River at the LeGore Bridge Road near Rocky Ridge, Maryland

The stream was slightly turbid, but minnows were observed throughout the area. Twenty-seven genera of bottom organisms were found. Excellent water quality was indicated by such clean-water organisms as stoneflies, mayflies (4 genera), caddisflies (3 genera), riffle beetles (2 genera), hellgrammites, gill-breathing snails (3 genera), and a Unio mussel. Out of 458 bottom organisms in the square foot sample there were 145 caddisflies, 63 riffle beetles, 52 mayflies, and 98 gill-breathing snails. Seventy-eight percent of the organisms in the square foot sample were clean-water forms.

Station #14 - Hunting Creek (tributary to the Monocacy River) at Hessong Bridge near Jimtown, Maryland

The water was somewhat turbid and a light fish-kill had occurred in the area about twenty-four hours earlier. A dead rainbow trout, a smallmouth bass, a rock bass, and a white sucker were found. In addition, a large white sucker was found which was still alive. It would appear that a light pollutant slug had passed through the area recently. This station was downstream from the Thurmont Sewage Treatment Plant. Ten genera of bottom organisms were found which included such clean-water forms as mayflies (2 genera), caddisflies (2 genera), and riffle beetles. Basically good water quality was present.

Station #15 - Hunting Creek (tributary to the Monocacy River) was sampled at the Old Frederick Road south of Creagerstown, Maryland

The water was clear and numerous minnows were observed. Improved biological conditions were indicated by the thirteen genera of bottom organisms versus ten upstream. They included such clean-water forms as mayflies (2 genera), caddisflies (2 genera), riffle beetles, and gill-breathing snails (2 genera). Good water quality was contributed to the Monocacy River.

Station #16 - Monocacy River at Devilbiss Bridge near Hansonville, Maryland

The water was extremely clear and minnows were observed throughout the area. A total of twenty-four genera of bottom organisms were found indicating excellent water quality. They included such clean-water representatives as stoneflies, mayflies (5 genera), caddisflies

(4 genera), and gill-breathing snails (2 genera). Out of 2,426 bottom organisms in the square foot sample there were 464 mayflies, 384 riffle beetles, 176 caddisflies, 8 gill-breathing snails, 1 hellgrammite, and 1 Unio mussel. Clean-water organisms made up approximately 43 percent of the quantitative sample.

Station #17 - Glade Creek (tributary to the Monocacy River) at Retreat Road

The water was clear, but silt was heavy in some sections. Submerged aquatic plants were very profuse. Only two kinds of bottom organisms were present. They consisted of flatworms and bristleworms. The former is an intermediate and the latter is a pollution-tolerant form. Flatworms were extremely abundant. Poor water quality was indicated at this location.

Station #18 - Monocacy River at Ceresville Bridge at Maryland Route 26

Minnows were abundant and the stream was clear. Excellent water quality was indicated by twenty-two genera of bottom organisms which included clean-water mayflies (4 genera), caddisflies (3 genera), riffle beetles (2 genera), hellgrammites, gill-breathing snails (2 genera), and Unio mussels. Of 409 bottom organisms in the square foot sample, there were 258 caddisflies, 59 mayflies, 15 riffle beetles, and 48 gill-breathing snails. Excellent water quality was shown by the fact that 93 percent of the quantitative sample were clean-water forms.

Station #19 - Monocacy River at the Gas House Pike Road upstream from Frederick, Maryland

The water was turbid and deep due to a coffer dam constructed for a new bridge downstream. Only eleven genera of bottom organisms were found versus twenty-two upstream. However, they included such clean-water forms as stoneflies, mayflies (2 genera), riffle beetles, and gill-breathing snails (2 genera). The drop in number of kinds could partially be attributed to impounded conditions and poor sampling habitat. Good water quality was still indicated although some degradation from the upstream station would be indicated.

Station #20 - Carroll Creek (tributary to Monocacy Creek) was sampled at the bridge upstream from the Frederick Sewage Treatment Plant

The water was clear, but vegetation was sparse. Only five genera of bottom organisms were found which consisted of bristleworms (2 genera), bloodworms, and intermediate midge larvae, and an air-breathing snail. Out of 1,017 bottom organisms in the square foot sample there were 778 sludgeworms, 1 other bristleworm, 140 bloodworms, and 98 intermediate midge larvae. Moderately heavy organic pollution was indicated at this station.

Station #21 - Monocacy River immediately upstream from Linganore Creek near Hughes Ford

The water was extremely black and the sewage odor was pronounced. Only eleven kinds of bottom organisms were found. They consisted of seven pollution-tolerant and four intermediate forms. There were 2,109 bottom organisms in the square foot sample which was made up of 960 sludgeworms, 805 intermediate midges, 123 bloodworms,

109 leeches, and 112 bristleworms. All except the intermediate midge are very tolerant of organic pollution. In addition, a few carp were observed in the area. Heavy organic pollution was indicated at this station.

Station #22 - Monocacy River at the Route 40 West Bridge downstream from Frederick, Maryland

Aquatic vegetation was heavy and the water was much clearer. Numerous sunfish and minnows were present. Improved biological conditions were present as indicated by the fifteen different genera of bottom organisms present versus eleven at the upstream station. The dominant bottom organisms were leeches, air-breathing snails, sludge-worms, and bloodworms. However, a few clean-water organisms such as mayflies (2 genera) were found. These were present in limited numbers. The stream showed signs of recovery at this station, however recovery had not yet occurred.

Station #23 - Monocacy River at the Maryland Route 355 Bridge near Monocacy Park, Maryland

The water was very clear and the aquatic vegetation was quite heavy. Minnows were observed throughout the area. Fifteen genera of bottom organisms were present including such clean-water forms as mayflies (2 genera), caddisflies (2 genera), and gill-breathing snails. Out of 1,552 bottom organisms in the square foot sample, 848 were intermediate midge larvae. The balance was made up of 248 blackfly larvae, 216 caddisfly larvae, 168 leeches, 40 flatworms, 24 mayflies, and 8 air-breathing snails. Several fishermen and fish were also observed in the area. Recovery was indicated at this station.

Station #24 - Monocacy River at the Maryland Route 80 Bridge near Buckeystown, Maryland

The water was very clear and fish and fishermen were observed at this station. Seventeen genera of bottom organisms were found at this station. Excellent water quality was indicated by such clean-water organisms as mayflies (4 genera), caddisflies (5 genera), and riffle beetles. Mayflies and caddisflies were abundant. Other bottom organisms sampled consisted of damselflies (2 genera), flatworms, midge larvae, scuds, fingernail clams, and an air-breathing snail. High water quality was indicated by the dominance of clean-water forms and the large diversification of bottom organisms.

Station #25 - Bennett Creek (tributary to the Monocacy River) at the Mt. Ephraim Road Bridge near Park Mills, Maryland

The water was clear but vegetation was relatively sparse at this station. Fourteen genera of bottom organisms were found here. Excellent water quality was indicated by such clean-water organisms as mayflies (2 genera), caddisflies, fishflies, and gill-breathing snails. Mayflies and caddisflies were abundant. Good quality water was contributed to the Monocacy River by Bennett Creek.

Station #26 - Monocacy River at the Maryland Route 28 Bridge near Furnace Ford, Maryland

The water was very clear and aquatic vegetation was sparse. Excellent water quality was indicated by the twenty genera of bottom organisms which were found at this station. Clean-water representatives included stoneflies (2 genera), mayflies (5 genera), caddisflies (2 genera), riffle beetles and hellgrammites. Out of 605 bottom

organisms in the square foot sample, there were 153 riffle beetles, 149 mayflies, 140 intermediate midge larvae, 94 caddisfly larvae, 60 flatworms (intermediate), eight fly larvae (pollution-tolerant), and one bristleworm (pollution-tolerant). Excellent water quality was contributed to the Potomac River.

TABLE I

BOTTOM ORGANISMS DATA OF THE
MONOCACY RIVER AND TRIBUTARIES

Station Number	Location	Bottom Organisms		Dominant Forms	Indicated Water Quality
		No. of Kinds	No. Per Sq. Ft.		
1	Rock Creek (joins Marsh Creek to form the Monocacy River) sampled at the U.S. 15 Business Route Bridge upstream from Gettysburg, Pa.	14	Not taken	Mayflies Unio mussels	Good
2	Rock Creek downstream from Gettysburg, Pa. at the U.S. 15 Bypass Bridge	9	2,651	Sludgeworms Bloodworms	Polluted
3	Monocacy River at the Harney Bridge near Harney, Md.	16	392	Caddisflies Riffle beetles Mayflies	Good
4	Monocacy River at the Md. Rt. 97 Bridge at Bridgeport, Md.	13	Not taken	Mayflies Caddisflies Riffle beetles	Good
5	Tom's Creek (tributary to the Monocacy River) at the bridge on Creamery Road one mile south of Emmitsburg, Md.	8	Not taken	Mayflies Caddisflies Riffle beetles	Good
6	Flat Run (tributary to Tom's Creek which is a tributary to the Monocacy River) was sampled at Route 806 north of Emmitsburg, Md.	3	Not taken	Mayflies	Good
7	Flat Run at the U.S. Route 15 Bridge near Emmitsburg, Md.	3	Not taken	Midge larvae Beetle larvae Smoky alderfly	Mild pollution
8	Tom's Creek at the bridge at the junction of Four Points Road and Keysville Road near Emmitsburg, Md.	9	Not taken	Leeches	Mild pollution

TABLE I (Continued)

Station Number	Location	Bottom Organisms: No. of Kinds	Bottom Organisms: No. Per Sq. Ft.	Dominant Forms	Indicated Water Quality
9	Tom's Creek at Sixes Road Bridge near Keysville, Md.	12	Not taken	Mayflies Caddisflies Riffle beetles	Good
10	Monocacy River at the Mumma Ford Bridge	14	Not taken	Mayflies Caddisflies Riffle beetles	Good
11	Big Pipe Creek (joins Little Pipe Creek to form Double Pipe Creek) sampled at Md. Route 194 Bridge at Bruceville, Md.	8	Not taken	Mayflies Caddisflies Gill-breathing snails	Good
12	Little Pipe Creek (joins Big Pipe Creek to form Double Pipe Creek) was sampled at Md. Route 194 Bridge near Keymar, Md.	12	Not taken	Mayflies Caddisflies Riffle beetles Gill-breathing snails	Good
13	Monocacy River at the LeGore Bridge Road near Rocky Ridge, Md.	27	458	Caddisflies Riffle beetles Mayflies Gill-breathing snails	Excellent
14	Hunting Creek (triburary to the Monocacy River) at the Hessong Bridge near Jimtown, Md.	10	Not taken	Mayflies Caddisflies Riffle beetles	Good
15	Hunting Creek (tributary to the Monocacy River) was sampled at the Old Frederick Road south of Creagerstown, Md.	13	Not taken	Mayflies Caddisflies Riffle beetles Gill-breathing snails	Good
16	Monocacy River at Devilbiss Bridge near Hansonville, Md.	24	2,426	Mayflies Riffle beetles Caddisflies	Excellent
17	Glade Creek (tributary to the Monocacy River) at Retreat Road	2	Not taken	Flatworms Pristleworms	Mild pollution

TABLE I (Continued)

Station Number	Location	Bottom Organisms: No. of Kinds	Bottom Organisms: No. Per Sq. Ft.	Dominant Forms	Indicated Water Quality
18	Monocacy River at Ceresville Bridge at Maryland Route 26	22	409	Caddisflies Mayflies Gill-breathing snails	Excellent
19	Monocacy River at the Gas House Pike Road upstream from Frederick, Md.	11	Not taken	Mayflies Riffle beetles Gill-breathing snails Stoneflies	Good
20	Carroll Creek (tributary to Monocacy Creek) was sampled at the bridge upstream from the Frederick Sewage Treatment Plant	5	1,017	Sludgeworms Bloodworms Midge larvae	Moderately heavy pollution
21	Monocacy River immediately upstream from Linganore Creek near Hughes Ford	11	2,109	Sludgeworms Midge larvae Bloodworms Leeches Bristleworms	Heavy organic pollution
22	Monocacy River at the Route 40 West Bridge downstream from Frederick, Md.	15	Not taken	Leeches Air-breathing snails Sludgeworms Bloodworms	Mild pollution
23	Monocacy River at the Md. Route 355 Bridge near Monocacy Park, Md.	15	1,552	Midge larvae Blackfly larvae Caddisfly larvae Leeches	Good
24	Monocacy River at the Md. Route 80 Bridge near Buckeystown, Md.	17	Not taken	Mayflies Caddisflies	Good

TABLE I (Continued)

Station Number	Location	Bottom Organisms		Dominant Forms	Indicated Water Quality
		No. of Kinds	No. Per Sq. Ft.		
25	Bennett Creek (tributary to the Monocacy River) at the Mt. Ephraim Road Bridge near Park Mills, Md.	14	Not taken	Mayflies Caddisflies Fishflies Gill-breathing snails	Good
26	Monocacy River at the Md. Route 28 Bridge near Furnace Ford, Md.	20	605	Riffle beetles Mayflies Midge larvae Caddisflies	Excellent

TABLE II

TABULATION OF BOTTOM ORGANISMS

MONOCACY RIVER AND TRIBUTARIES

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
1. Rock Creek at Business Rt. #15 Bridge north of Gettysburg, Pa.	Gastropoda			
	Pulmonata			
	Physa sp.	x		
	Gyraulus sp.	x		
	Pelecypoda			
	Sphaeriidae			
	Sphaerium sp.	x		
	Unionidae			
	Ligumia sp.	x		
	Hirudinea			
	Placobdella sp.	x		
	Oligochaeta			
	Tubificidae			
	Branchiura sowerbyi	x		
	Megaloptera			
	Sialis sp.	x		
	Odonata			
	Zygoptera			
	Ischnura sp.	x		
	Ephemeroptera			
	Hexagenia sp.	x		
	Stenonema sp.	x		
	Tricorythodes sp.	x		
	Ameletus sp.	x		
	Diptera			
	Tendipedidae			
	Polypedilum sp.	x		
	Diamesinae	x		

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
2. Rock Creek at By-Pass U. S. Rt. 15 Bridge	Hirudinea			
	Erpobdella sp.	x	7	0.26
	Helobdella sp.	x	3	0.11
	Amphipoda			
	Hyalella sp.	x	235	8.87
	Odonata			
	Anisoptera			
	Libellula sp.	x		
	Zygoptera			
	Ischnura sp.	x		
	Oligochaeta			
	Plesiopora			
	Tubifex sp.		1,602	60.43
	Gastropoda			
	Pulmonata			
	Gyraulus sp.		27	1.02
	Physa sp.		15	0.37
	Diptera			
	Tendipedidae			
	Tendipes tentans	x	762	28.74
	Total Number of Organisms per Square Foot		2,651	
3. Monocacy River near Harney, Md.	Turbellaria			
	Tricladia			
	Dugesia sp.	x	34	8.67
	Oligochaeta			
	Plesiopora			
	Tubifex sp.		45	11.48
	Odonata			
	Zygoptera			
	Ischnura sp.		3	0.77

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
3. (Continued)	Ephemeroptera			
	Stenonema sp.	x	12	3.06
	Tricorythodes sp.		6	1.53
	Trichoptera			
	Hydropsyche sp.	x	101	25.76
	Limnephilus sp.	x		
	Megaloptera			
	Sialis sp.		7	1.79
	Coleoptera			
	Stenelmis sp.		59	15.05
	Psephenus sp.		6	1.53
	Tendipedidae			
	Cricotobus sp.		9	2.30
	Polypedilum sp.		52	13.27
	Decapoda			
	Cambarus sp.	x		
	Gastropoda			
	Prosobranchia			
	Lioplax sp.	x	10	2.55
	Pelecypoda			
	Sphaeriidae			
	Sphaerium sp.	x	48	12.24
	Unionidae			
	Ligumia sp.	x		
	Total Number of Organisms per Square Foot		392	

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
4. Monocacy River at Bridgeport, Md.	Crustacea			
	Malacostra			
	Decapoda			
	Cambarus sp.	x		
	Amphipoda			
	Hyalella sp.	x		
	Ephemeroptera			
	Stenonema sp.	x		
	Odonata			
	Anisoptera			
	Dorocordulia sp.	x		
	Zygoptera			
	Argia sp.	x		
	Ischnura sp.	x		
	Megaloptera			
	Sialis sp.	x		
	Coleoptera			
	Psephenus sp.	x		
	Mollusca			
	Pelecypoda			
	Sphaeriidae			
	Sphaerium sp.	x		
	Unionidae			
	Lampsilis siliquoidea	x		
	Lampsilis ventricosa	x		
	Lasmigona sp.	x		
	Ligumia sp.	x		
5. Flat Run (tributary to Tom's Creek-Monocacy River) north of Emmitsburg, Md.	Ephemeroptera			
	Stenonema sp.	x		
	Hemiptera			
	Ranatra fusca	x		

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
5. (Continued)	Crustacea			
	Decapoda			
	Cambarus sp.	x		
6. Flat Run (tributary to Tom's Creek-Monocacy River) near Emmitsburg, Md.	Megaloptera			
	Sialis sp.	x		
	Coleoptera			
	Coptotomus sp.	x		
	Diptera			
	Tendipedidae			
	Polypedilum sp.	x		
7. Tom's Creek one mile south of Emmitsburg (Tributary to Monocacy River)	Platyhelminthes			
	Turbellaria			
	Tricladia			
	Dugesia sp.	x		
	Ephemeroptera			
	Isonychia sp.	x		
	Stenonema sp.	x		
	Coleoptera			
	Psephenus sp.	x		
	Trichoptera			
	Chimarra sp.	x		
	Mollusca			
	Gastropoda			
	Pulmonata			
	Gyraulus sp.	x		
	Prosobranchia			
	Lioplax sp.	x		
	Pelecypoda			
	Sphaeriidae			
	Sphaerium sp.	x		

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
8. Tom's Creek near Emmitsburg, Md. (Tributary to Monocacy River)	Platyhelminthes			
	Turbellaria			
	Tricladia			
	Dugesia sp.	x		
	Hirudinea			
	Erpobdella sp.	x		
	Glossiphonia sp.	x		
	Coleoptera			
	Psephenus sp.	x		
	Stenelmis sp.	x		
	Mollusca			
	Gastropoda			
	Pulmonata			
	Gyraulus sp.	x		
	Lioplax sp.	x		
	Pelecypoda			
	Sphaeriidae			
	Musculium sp.	x		
	Sphaerium sp.	x		
9. Tom's Creek near Keysville, Md. (Tributary to Monocacy River)	Platyhelminthes			
	Turbellaria			
	Tricladia			
	Dugesia sp.	x		
	Crustacea			
	Malacostraca			
	Amphipoda			
	Hyalella sp.	x		
	Ephemeroptera			
	Stenonema sp.	x		
	Coleoptera			
	Psephenus sp.	x		
	Diptera			
	Culex sp.	x		

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
9. (Continued)	Megaloptera			
	Sialis sp.	x		
	Trichoptera			
	Hydropsyche sp.	x		
	Mollusca			
	Gastropoda			
	Pulmonata			
	Gyraulus sp.	x		
	Heliosoma sp.	x		
	Prosobranchia			
	Lioplax sp.	x		
	Pelecypoda			
	Sphaeriidae			
	Sphaerium sp.	x		
	Unionidae			
	Lampsilis sp.	x		
10. Monocacy River at Mumma Ford Bridge	Crustacea			
	Malacostraca			
	Amphipoda			
	Hyalella sp.	x		
	Ephemeroptera			
	Stenonema sp.	x		
	Odonata			
	Zygoptera			
	Argia sp.	x		
	Ischnura sp.	x		
	Coleoptera			
	Psephenus sp.	x		
	Stenelmis sp.	x		
	Trichoptera			
	Hydropsyche sp.	x		
	Smicridea sp.	x		

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
10. (Continued)	Diptera			
	Tendipedidae			
	Cryptochironomus sp.	x		
	Mollusca			
	Gastropoda			
	Prosobranchia			
	Lioplax sp.	x		
	Pelecypoda			
	Sphaeriidae			
	Sphaerium sp.	x		
	Unionidae			
	Elliptio dilatatus	x		
	Lampsilis ventricosa	x		
	Ligumia sp.	x		
11. Big Pipe Creek at Bruceville, Md. (Tributary to Double Pipe Creek-Monocacy River)	Ephemeroptera			
	Isonychia sp.	x		
	Stenonema sp.	x		
	Coleoptera			
	Psephenus sp.	x		
	Trichoptera			
	Cheumatopsyche sp.	x		
	Chimarra sp.	x		
	Hydropsyche sp.	x		
	Gastropoda			
	Pulmonata			
	Heliosoma sp.	x		
	Lioplax sp.	x		

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
12. Little Pipe Creek near Keymar, Md. (Joins Big Pipe Creek to form Double Pipe Creek)	Ephemeroptera			
	Isonychia sp.	x		
	Stenonema sp.	x		
	Coleoptera			
	Psephenus sp.	x		
	Trichoptera			
	Cheumatopsyche sp.	x		
	Neureclipsis sp.	x		
	Odonata			
	Zygoptera			
	Agrion sp.	x		
	Megaloptera			
	Sialis sp.	x		
	Diptera			
	Tendipedidae			
	Polypedilum sp.	x		
	Gastropoda			
	Pulmonata			
	Ferrissia sp.	x		
	Physa sp.	x		
	Prosobranchia			
	Lioplax sp.	x		
	Pelecypoda			
	Sphaerium sp.	x		
13. Monocacy River near Rocky Ridge, Md.	Platyhelminthes			
	Turbellaria			
	Tricladia			
	Dugesia sp.	x	12	2.62
	Oligochaeta			
	Tubificidae			
	Tubifex sp.		34	7.42
	Lumbriculidae	x		

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism In Square Foot Sample	Per Cent of Quantitative Sample
13. (Continued)	Hirudinea			
	Eropobdella sp.	x		
	Plecoptera			
	Acroneuria sp.	x	1	0.22
	Ephemeroptera			
	Ameletus sp.	x		
	Ephoron sp.		1	0.22
	Isonychia sp.		23	5.02
	Stenonema sp.		28	6.11
	Megaloptera			
	Sialis sp.	x		
	Neuroptera			
	Corydalus cornutus	x		
	Coleoptera			
	Psephenus sp.		2	0.44
	Stenelmis sp.		61	13.32
	Trichoptera			
	Cheumatopsyche sp.		124	27.07
	Chimarra sp.		17	3.71
	Caddis pupa		4	0.87
	Hydropsyche sp.	x		
	Odonata			
	Anisoptera			
	Gomphus sp.	x		
	Zygoptera			
	Argia sp.	x		
	Diptera			
	Tendipedidae			
	Polypedilum sp.		14	3.06
	Mollusca			
	Gastropoda			
	Pulmonata			
	Gyraulus sp.		2	0.44
	Physa sp.	x		

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
13. (Continued)	Prosobranchia			
	Campeloma sp.	x		
	Lioplax sp.		98	21.40
	Pleurocerca sp.	x		
	Pelecypoda			
	Sphaeriidae			
	Sphaerium sp.		37	8.08
	Unionidae			
	Lasmigona sp.	x		
	Total Number of Organisms per Square Foot		458	
14. Hunting Creek near Jimtown, Md. (Tributary to Monocacy River)	Ephemeroptera			
	Ameletus sp.	x		
	Stenonema sp.	x		
	Odonata			
	Aeschna sp.	x		
	Megaloptera			
	Sialis sp.	x		
	Coleoptera			
	Psephenus sp.	x		
	Trichoptera			
	Cheumatopsyche sp.	x		
	Hydropsyche sp.	x		
	Diptera			
	Tetanocerca sp.	x		
	Gastropoda			
	Pulmonata			
	Heliosoma sp.	x		
	Physa sp.	x		

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
15. Hunting Creek south of Creagerstown, Md. (Tributary to Monocacy River)	Platyhelminthes			
	Turbellaria			
	Tricladia			
	Dugesia sp.	x		
	Ephemeroptera			
	Isonychia sp.	x		
	Stenonema sp.	x		
	Megaloptera			
	Sialis sp.	x		
	Coleoptera			
	Psephenus sp.	x		
	Trichoptera			
	Chimarra sp.	x		
	Neureclipsis sp.	x		
	Caddis pupa	x		
	Mollusca			
	Gastropoda			
	Pulmonata			
	Gyraulus sp.	x		
	Heliosoma sp.	x		
	Prosobranchia			
	Lioplax sp.	x		
	Viviparus sp.	x		
	Pelecypoda			
	Musculium sp.	x		
	Sphaerium sp.	x		

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
16. Monocacy River near Hansonville, Md.	Platyhelminthes			
	Turbellaria			
	Tricladia			
	Dugesia sp.	x	712	29.35
	Crustacea			
	Malacostraca			
	Amphipoda			
	Hyalella sp.	x		
	Ephemeroptera			
	Ameletus sp.	x		
	Ephoron sp.		24	0.99
	Isonychia sp.	x	360	14.84
	Stenonema sp.	x	80	3.30
	Tricorythodes sp.	x		
	Plecoptera			
	Neoperla sp.	x		
	Neuroptera			
	Corydalis cornutus		1	0.04
	Coleoptera			
	Dineutus sp.		56	2.31
	Psephenus sp.		16	0.66
	Stenelmis sp.		368	15.17
	Odonata			
	Zygoptera			
	Argia sp.	x		
	Trichoptera			
	Cheumatopsyche sp.	x		
	Chimarra sp.		8	0.33
	Hydropsyche sp.	x	168	6.92
	Limnephilus sp.	x		
	Diptera			
	Tendipedidae			
	Polypedilum sp.		616	25.39
	Simuliidae			
	Simulium sp.		8	0.33

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism In Square Foot Sample	Per Cent of Quantitative Sample
16. (Continued)	Mollusca			
	Gastropoda			
	Prosobranchia			
	Lioplax sp.		7	0.29
	Pleurocerca sp.		1	0.04
	Pelecypoda			
	Sphaeriidae			
	Sphaerium sp.	x		
	Unionidae			
	Lampsilis sp.	x		
	Lasmigona compressa		1	0.04
	Total Number of Organisms per Square Foot		2,426	
17. Glade Creek at Retreat Road	Platyhelminthes			
	Turbellaria			
	Tricladia			
	Dugesia sp.	x		
	Oligochaeta			
	Lumbricidae	x		
18. Monocacy River at Rt. 26 Bridge, Ceresville, Md.	Platyhelminthes			
	Turbellaria			
	Tricladia			
	Dugesia sp.	x	11	2.69
	Oligochaeta			
	Tubificidae			
	Tubifex sp.	x	1	0.24

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
18. (Continued)	Crustacea			
	Malacostraca			
	Isopoda			
	Asellus sp.	x	1	0.24
	Ephemeroptera			
	Ameletus sp.	x		
	Ephoron sp.	x	4	0.98
	Isonychia sp.	x	55	13.45
	Stenonema sp.			
	Odonata			
	Anisoptera			
	Gomphus sp.	x		
	Neuroptera			
	Corydalus sp.	x		
	Megaloptera			
	Sialis sp.			
	Coleoptera			
	Psephenus sp.	x	1	0.24
	Stenelmis sp.	x	14	3.42
	Diptera			
	Simulium sp.	x	2	0.49
	Tendipedidae			
	Polypedilum sp.	x	14	3.42
	Diamesinae	x		
	Trichoptera			
	Chimarra sp.	x	18	4.41
	Hydropsyche sp.	x	239	58.44
	Macronemum sp.	x	1	0.24

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism In Square Foot Sample	Per Cent of Quantitative Sample
18. (Continued)	Mollusca			
	Gastropoda			
	Prosobranchia			
	Lioplax sp.	x	48	11.74
	Pleurocerca sp.	x		
	Pelecypoda			
	Sphaerium sp.	x		
	Unionidae			
	Elliptio sp.	x		
	Total Number of Organisms per Square Foot		409	
19. Monocacy River at Gas House Pike Road upstream from Frederick, Md.	Ephemeroptera			
	Stenonema sp.	x		
	Tricorythodes sp.	x		
	Plecoptera sp.	x		
	Neoperla sp.	x		
	Megaloptera			
	Sialis sp.	x		
	Odonata			
	Zygoptera			
	Ischnura sp.	x		
	Coleoptera			
	Psephenus sp.	x		
	Diptera			
	Tendipedidae			
	Metriocnemus sp.	x		

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism In Square Foot Sample	Per Cent of Quantitative Sample
19. (Continued)	Mollusca			
	Gastropoda			
	Pulmonata			
	Heliosoma sp.	x		
	Prosobranchia			
	Lioplax sp.	x		
	Pleurocerca sp.	x		
20. Carroll Creek at bridge upstream from Frederick STP	Oligochaeta			
	Tubificidae			
	Branchiura sp.	x	1	0.10
	Tubifex sp.	x	778	76.50
	Diptera			
	Tendipedidae			
	Tendipes sp.	x	140	13.76
	Diamesinae	x	98	9.64
	Mollusca			
	Gastropoda			
	Pulmonata			
	Physa sp.			
	Total Number of Organisms Per Square Foot		1,017	
21. Monocacy River near Hughes Ford Bridge	Oligochaeta			
	Lumbriculidae	x		
	Tubificidae			
	Branchiura sp.	x	112	5.31
	Tubifix sp.	x	960	45.52

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism In Square Foot Sample	Per Cent of Quantitative Sample
21. (Continued)	Hirudinea			
	Erpobdella sp.	x	109	5.17
	Crustacea			
	Malacostraca			
	Amphipoda			
	Hyalella sp.	x		
	Isopoda			
	Asellus sp.	x		
	Coleoptera			
	Hydrochara sp.	x		
	Diptera			
	Tendipedidae			
	Cryptochironomus sp.	x	805	38.17
	Tendipes sp.	x	123	5.83
	Mollusca			
	Pulmonata			
	Gyraulus sp.	x		
	Physa sp.	x		
	Total Number of Organisms per Square Foot		2,109	
22. Monocacy River at Rt. 40 West Bridge downstream from Frederick, Md.	Oligochaeta			
	Lumbriculidae	x		
	Hirudinea			
	Erpobdella sp.	x		
	Glossiphonia sp.	x		
	Crustacea			
	Malacostraca			
	Amphipoda			
	Gammarus sp.	x		
	Ephemeroptera			
	Ameletus sp.	x		
	Hexagenia sp.	x		

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism In Square Foot Sample	Per Cent of Quantitative Sample
22. (Continued)	Megaloptera			
	Sialis sp.	x		
	Odonata			
	Zygoptera			
	Ischmura sp.	x		
	Coleoptera			
	Hydroporus sp.	x		
	Tropisternus sp.	x		
	Diptera			
	Tendipedidae			
	Tendipes sp.	x		
	Mollusca			
	Pulmonata			
	Helisoma sp.	x		
	Physa sp.	x		
	Pelecypoda			
	Sphaeriidae			
	Sphaerium sp.	x		
23. Monocacy River near Monocacy Park, Md.	Platyhelminthes			
	Turbellaria			
	Tricladia			
	Dugesia sp.	x	40	2.58
	Hirudinea			
	Erpobdella sp.	x	168	10.82
	Crustacea			
	Malacostraca			
	Amphipoda			
	Hyalella sp.	x		
	Ephemeroptera			
	Isonychia sp.	x	16	1.03
	Stenonema sp.	x	8	0.51

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism In Square Foot Sample	Per Cent of Quantitative Sample
23. (Continued)	Odonata			
	Agrion sp.	x		
	Trichoptera			
	Macronemum sp.	x	216	13.92
	Hydropsyche sp.	x		
	Diptera			
	Simuliidae			
	Simulium sp.	x	248	15.98
	Tendipedidae			
	Cryptochironomus sp.	x	8	0.52
	Polypedilum sp.	x	840	54.12
	Mollusca			
	Gastropoda			
	Pulmonata			
	Ferrissia sp.	x	8	0.52
	Physa sp.	x		
	Prosobranchia			
	Lioplax sp.	x		
	Pelecypoda			
	Sphaeriidae			
	Sphaerium sp.	x		
	Total Number of Organisms per Square Foot		1,552	
24. Monocacy River near Buckeystown, Md.	Platyhelminthes			
	Turbellaria			
	Tricladia			
	Dugesia sp.	x		

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism In Square Foot Sample	Per Cent of Quantitative Sample
24. (Continued)	Crustacea			
	Malacostraca			
	Amphipoda			
	Hyallella sp.	x		
	Ephemeroptera			
	Ameletus sp.	x		
	Isonychia sp.	x		
	Stenonema sp.	x		
	Tricorythodes sp.	x		
	Odonata			
	Zygoptera			
	Enallagma sp.	x		
	Ischnura sp.	x		
	Trichoptera			
	Cheumatopsyche sp.	x		
	Chimarra sp.	x		
	Hydropsyche sp.	x		
	Hydroptila sp.	x		
	Macronemum sp.	x		
	Coleoptera			
	Psephenus sp.	x		
	Diptera			
	Tendipedidae			
	Polypedilum sp.	x		
	Mollusca			
	Gastropoda			
	Pulmonata			
	Ferrissia sp.	x		
	Pelecypoda			
	Sphaerium sp.	x		

TABLE II (Continued)

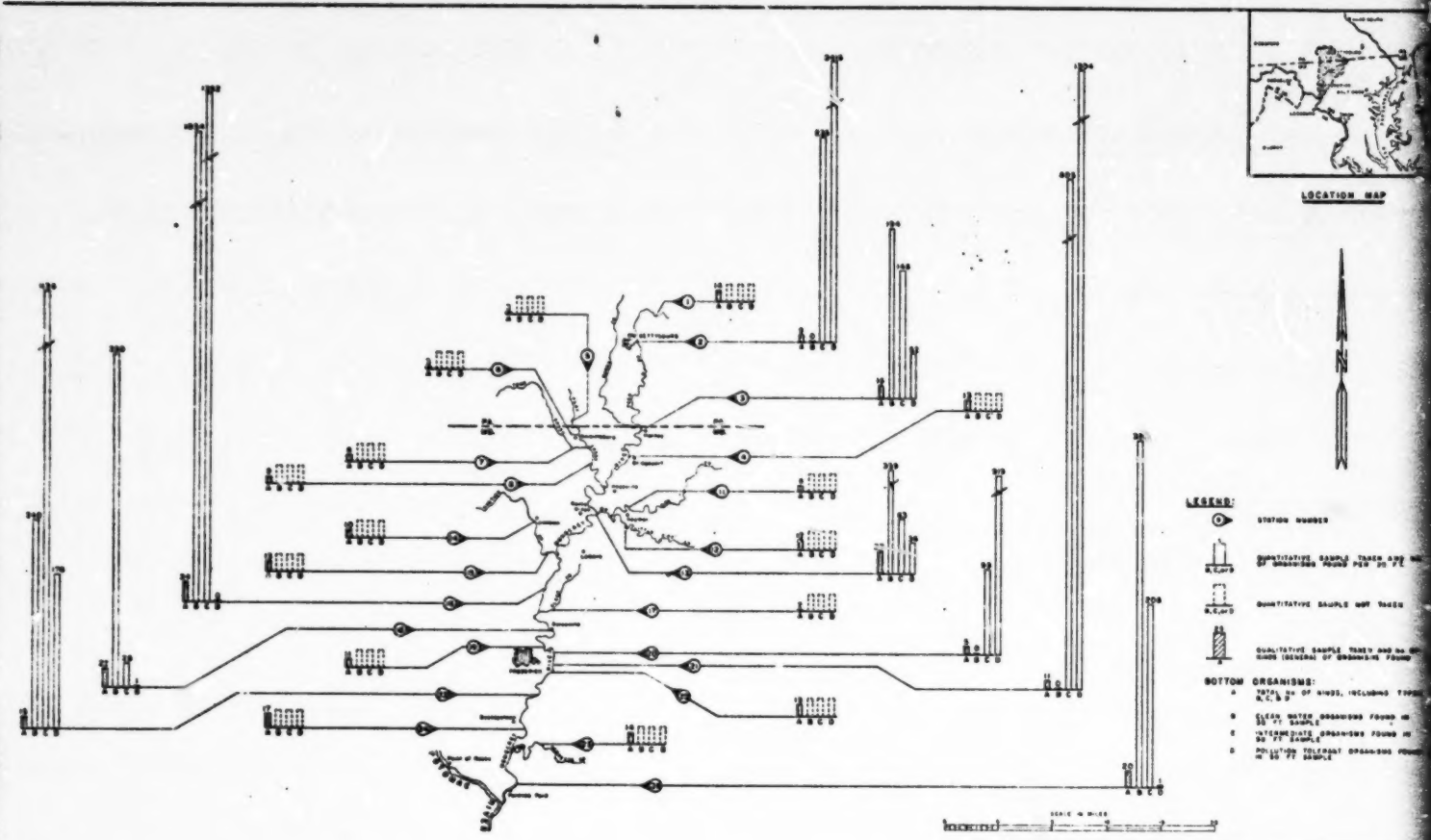
Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism In Square Foot Sample	Per Cent of Quantitative Sample
25. Bennett Creek (Trib. to Monocacy River) near Park Mills, Md.	Ephemeroptera			
	Isonychia sp.	x		
	Stenonema sp.	x		
	Neuroptera			
	Chauliodes sp.	x		
	Megaloptera			
	Sialis sp.	x		
	Odonata			
	Anisoptera			
	Gomphus sp.	x		
	Lanthus sp.	x		
	Zygoptera			
	Enallagma sp.	x		
	Coleoptera			
	Dineutus sp.	x		
	Trichoptera			
	Hydropsyche sp.	x		
	Diptera			
	Antocha sp.	x		
	Simulium sp.	x		
	Mollusca			
	Gastropoda			
	Pulmonata			
	Ferrissia sp.	x		
	Physa sp.	x		
	Prosobranchia			
	Lioplax sp.	x		

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism In Square Foot Sample	Per Cent of Quantitative Sample
26. Monocacy River at Rt. 28 Bridge near Furnace Ford, Md.	Platyhelminthes			
	Turbellaria			
	Tricladia			
	Dugesia sp.	x	60	9.92
	Oligochaeta			
	Lumbriculidae	x	1	0.16
	Tubificidae			
	Branchiura sp.	x		
	Crustacea			
	Amphipoda			
	Hyalella sp.	x		
	Ephemeroptera			
	Ameletus sp.	x		
	Hexagonia sp.	x	5	0.83
	Isonychia sp.	x	50	8.26
	Stenonema sp.	x	94	15.54
	Tricorythodes sp.	x		
	Plecoptera			
	Acroneuria sp.	x		
	Perlinae sp.	x		
	Neuroptera			
	Corydalis sp.	x		
	Megaloptera			
	Sialis sp.			
	Trichoptera			
	Hydropsyche sp.	x	94	15.54
	Macronemum sp.	x		
	Odonata			
	Agrion sp.	x		
	Coleoptera			
	Stenelmis sp.	x	153	25.29

TABLE II (Continued)

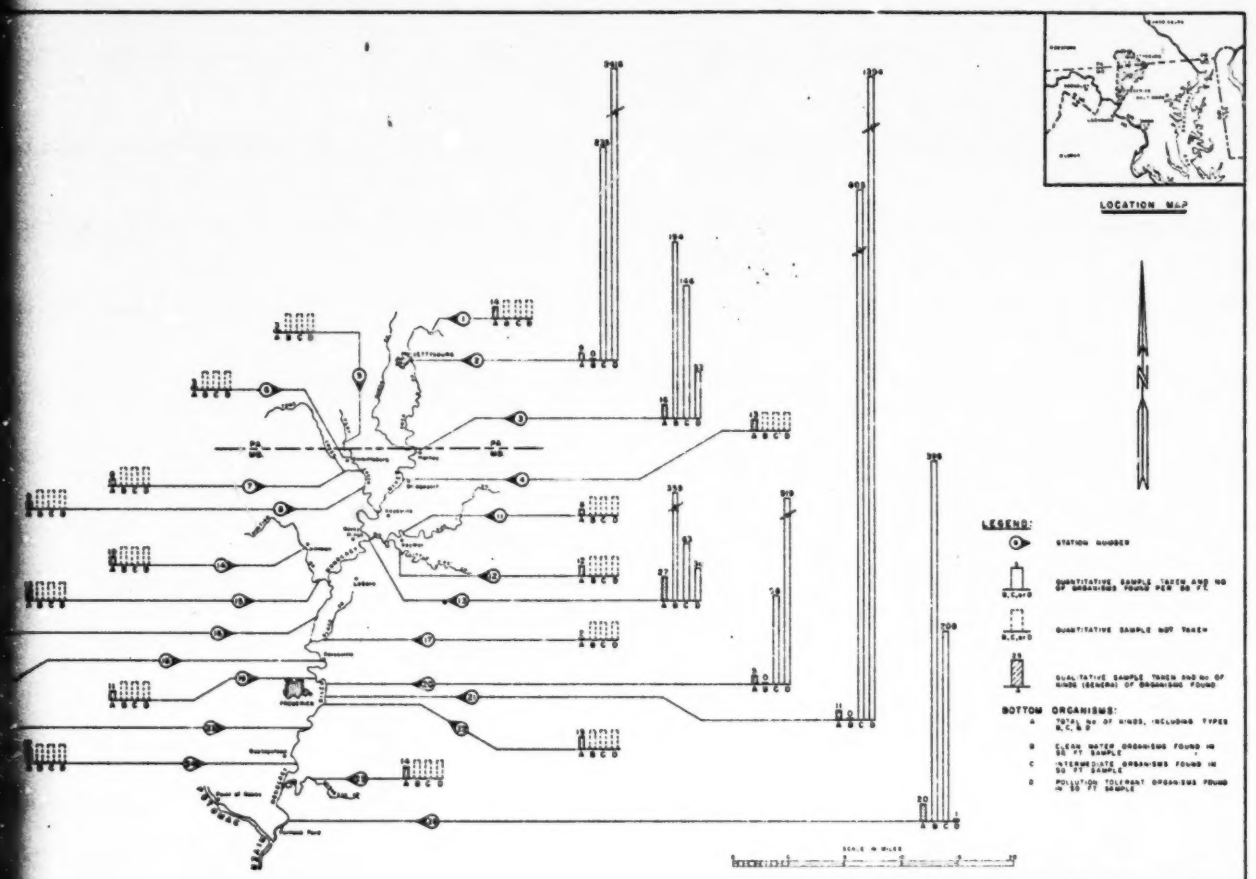
Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism In Square Foot Sample	Per Cent of Quantitative Sample
26. (Continued)	Diptera			
	Tipula sp.	x	8	1.32
	Tendipedidae			
	Cryptochironomus sp.	x	140	23.14
	Mollusca			
	Gastropoda			
	Prosobranchia			
	Amnicola sp.	x		
	Total Number of Organisms per Square Foot		605	



MONOCACY RIVER SUB-BASIN
POTOMAC RIVER DRAINAGE BASIN

BIOLOGICAL SURVEY
MONOCACY RIVER & TRIBUTARIES
(GETTYSBURG, PA. – FURNACE FORD, MD.)

U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
MIDDLE ATLANTIC REGION CHARLOTTESVILLE, VA.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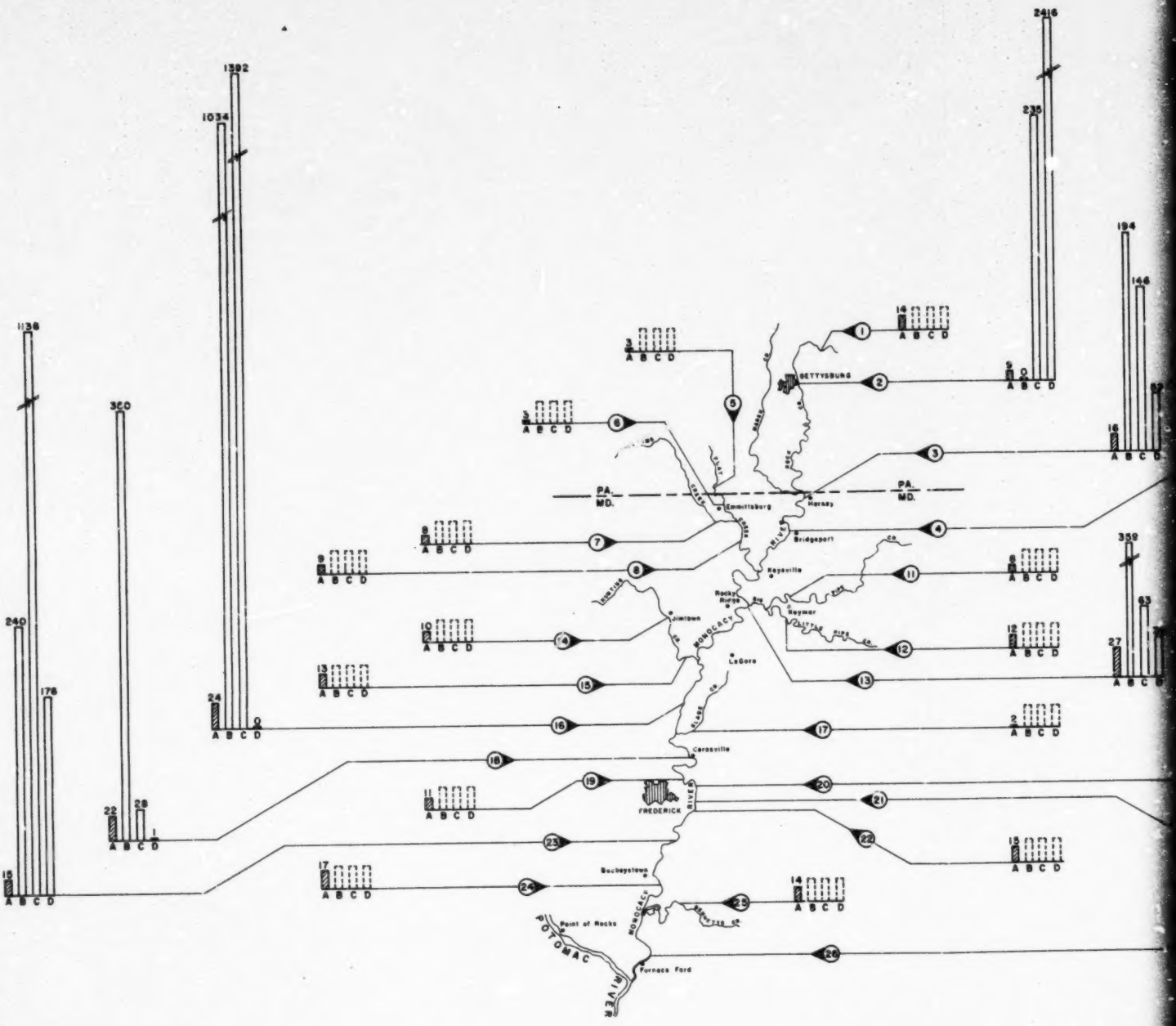
LEGEND:
STATION NUMBER
QUANTITATIVE SAMPLE TAKEN AND NO OF ORGANISMS FOUND PER SQ FT
QUANTITATIVE SAMPLE NOT TAKEN
QUALITATIVE SAMPLE TAKEN AND NO OF KINDS (GENERA) OF ORGANISMS FOUND
BOTTOM ORGANISMS:
A TOTAL NO OF KINDS, INCLUDING TYPES B, C & D
B CLEAN WATER ORGANISMS FOUND IN SQ FT SAMPLE
C INTERMEDIATE ORGANISMS FOUND IN SQ FT SAMPLE
D POLLUTION TOLERANT ORGANISMS FOUND IN SQ FT SAMPLE
N
SCALE IN MILES

MONOCACY RIVER SUB-BASIN
POTOMAC RIVER DRAINAGE BASIN

BIOLOGICAL SURVEY
MONOCACY RIVER & TRIBUTARIES
(GETTYSBURG, PA. – FURNACE FORD, MD.)

U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
MIDDLE ATLANTIC REGION CHARLOTTESVILLE, VA.

-45-


PA.
MD.
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MD.
GETTYSBURG
Emmitsburg
Harney
Bridgeport
Keysville
Rocky Ridge
Keymar
Jimtown
LaGore
Taneytown
Creagerstown
FREDERICK
Buckeystown
Point of Rocks
Furnace Ford
MONOCACY
POTOMAC
RIVER
1382
1034
1138
360
240
176
24
22
28
15
2416
235
194
146
16
14
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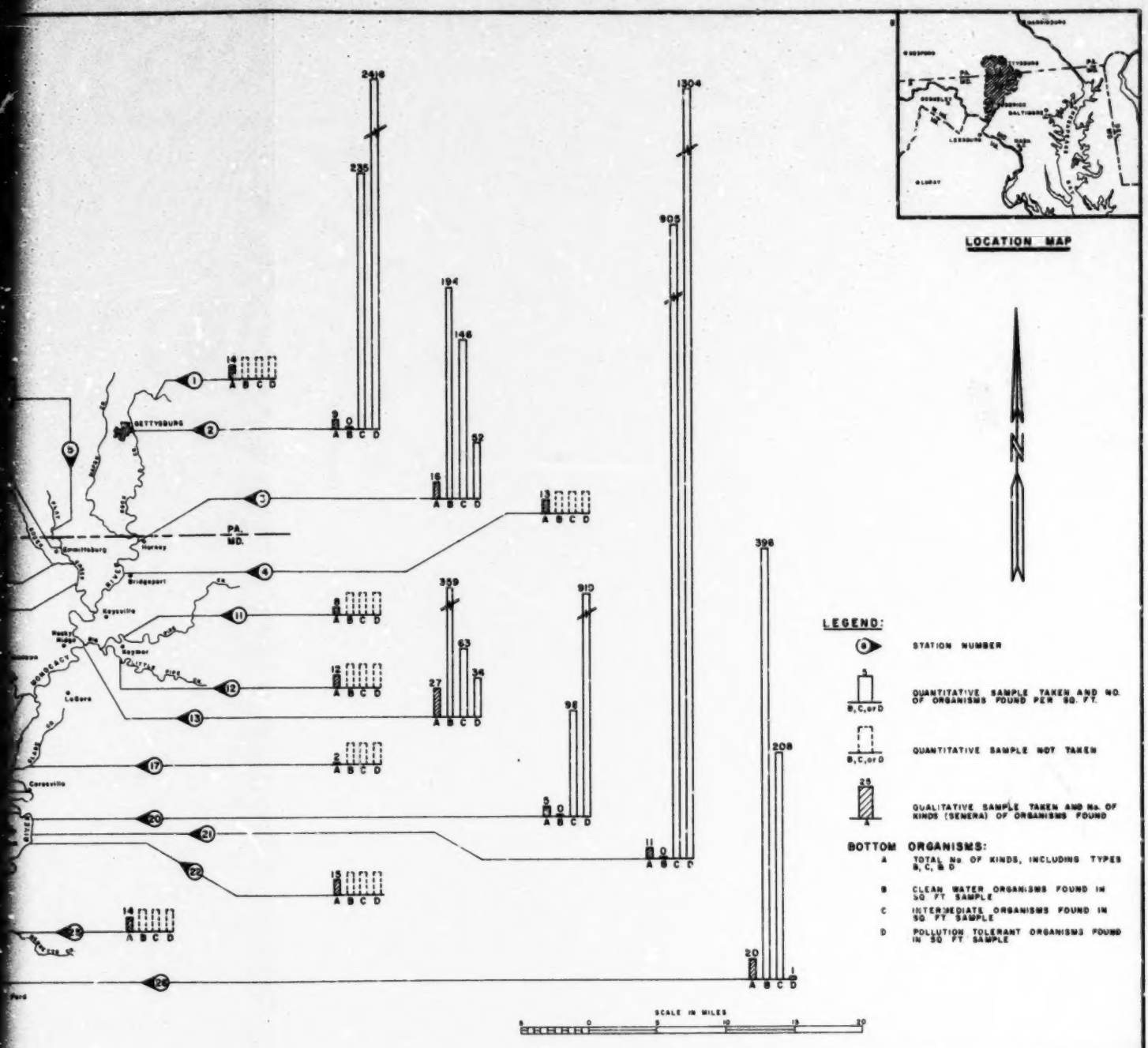

MONOCACY RIVER SUB-BASIN
POTOMAC RIVER DRAINAGE BASIN

BIOLOGICAL SURVEY
MONOCACY RIVER & TRIBUTARIES
(GETTYSBURG, PA. – FURNACE FORD, MD.)

U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
MIDDLE ATLANTIC REGION CHARLOTTESVILLE, VA.